Universität Basel

Research Project

Allen Discovery Center for Cell Lineage Tracing

Third-party funded project

Project title Allen Discovery Center for Cell Lineage Tracing
Principal Investigator(s) Schier, Alexander ;
Organisation / Research unit
Departement Biozentrum / Cell and Developmental Biology (Schier)
Department
Project Website http://schierlab.biozentrum.unibas.ch
Project start 01.01.2020
Probable end 31.08.2021
Status Completed

The Schier lab has pioneered the use of zebrafish as a model system. The Schier lab will contribute to all aspects of the project that involve zebrafish and help put all findings in the context of developmental biology. The Schier lab will also contribute to the development of novel approaches for barcode editing and cell type classification, generating a global lineage map of zebrafish, and annotating the resulting trees based on reporters for cell signalling and additional processes. Dr. Schier will have immediate oversight over local fiscal and administrative issues at Harvard. In Aim 1, the Schier lab will develop novel approaches and transgenic lines for barcode editing and cell type classification. We will implement and assess several schemes, including: 1) Temperature-, light- or drug- inducible Cas9 expression (to titrate the editing rate, or to calibrate editing events against absolute time); 2) Limiting either Cas9 expression or guide RNA expression to a defined cell cycle window (to “count” cell divisions); 3) Linking Cas9 and/or guide RNA expression to specific “molecular events”, e.g. lineage-specific TFs, morphogens, signal transduction cascades, or metabolic sensors, to record cellular histories. In Aim 2, the Schier lab will generate large-scale lineage trees of zebrafish development. These trees will be generated for multiple developmental time points and biological replicates, and will be richly annotated with end-point data tracks including spatial context and cell type. In Aim 3, the Schier lab will annotate the trees with signalling reporters and additional biological processes.

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